

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-30

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2004 Survey Report

Lake Fairfield

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EXECUTIVE SUMMARY

Lake Fairfield was surveyed during the period June 2004 to May 2005 using electrofishing, trap nets, gill nets, roving angler creel survey, littoral zone habitat and vegetation surveys, and an angler access and facilities survey. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Lake Fairfield is a 2,034-acre reservoir on Big Brown Creek, Texas, a tributary of the Trinity River, providing cooling water for two 575-megawatt lignite-fired electric generation units. Boat and bank access were adequate with two boat ramps and one fishing pier. The fishing pier meets ADA specifications. Native emergent vegetation (giant cane and cattails) formed a fringe in the littoral zone, around most of the lake. American lotus was abundant in shallow water (<4 feet deep) in the back of the coves. Hydrilla was less abundant than in previous years and only occupied a narrow fringe in shallow water areas.
- **Prey species:** Electrofishing catch rate of gizzard shad was higher in 2004 (42 fish/hour) than in the previous survey (2002 = 10 fish/hour), and was similar to 2000 (60 fish/hour). Approximately half of the catch was fish < 5 inches in length. Electrofishing catch rate of threadfin shad was 112 fish/hour and all were a size available to predators in this lake. Sunfish (i.e., bluegill and redear sunfish) also contribute to the prey base. Electrofishing catch rate of sunfishes, ≤ 4 inches in length, was over 300 per hour, providing excellent prey for the lakes' predators.
- **Catfishes:** Channel catfish at Lake Fairfield provide an excellent fishery. The catfish fishery accounted for over 14% (1.5 hours/acre) of the total fishing effort (second only to largemouth bass) from December 1, 2002 to February 28, 2003. Angling catch rate of catfish was 4.2 fish/hour and harvest rate was 3.7 fish/hour. The majority of channel catfish collected in gill nets were legal size (≥ 12 inches). Gill net catch rate of stock-size channel catfish in 2005 (18.4 fish/net night) was similar to 2003 (19.2 fish/net night) and 2001 (17.4 fish/net night), but was considerably higher than 1996 when the catch rate was only 2.6 fish/net night. Age-and-growth analysis was not conducted as part of the 2005 assessment. Previous analysis (Ott and Bister 2001) indicated that channel catfish growth was rapid with fish reaching legal size (12 inches) by age 1 or 2. Prey availability for channel catfish was adequate as mean W_r for most inch classes was >100 and showed only a slight decreasing trend with increased length.
- **Palmetto bass:** Palmetto bass have not been stocked in Lake Fairfield since 1999. Only one specimen was collected in gill nets in 2005 and it is unlikely that this species still contributes to the fishery. No directed effort or harvest was reported during the quarterly creel survey conducted from December 1, 2002 through February 28, 2003.

- **Sunfishes:** The sunfish populations in Lake Fairfield consisted primarily of bluegill and redear sunfish. High reservoir productivity and good habitat likely contribute to the abundance of bluegill which were the predominate species. Bluegill as large as 8 inches in length were collected and represent a potential sport fishery for light tackle or fly fishers. Directed effort for sunfish, estimated from the angler creel survey conducted December 1, 2002 to February 28, 2003, was only 0.16 hours/acre. This survey did not document any catch or harvest by anglers targeting this species group. However, a few redear sunfish were harvested by anglers seeking other species.
- **Black basses:** The largemouth bass population continued to provide good quality fishing. Largemouth bass were the most sought after species (angling effort = 7.9 hours/acre; 78% of total effort) from December 1, 2002 to February 28, 2003. Angling catch rate of largemouth bass was 0.50 fish/hour. Recruitment of largemouth bass has remained consistent and electrofishing catch rate of sub-stock size fish (89 fish/hour) was similar to previous surveys. However, electrofishing catch rate for 14 to 18 inch fish (15 fish/hour) was somewhat lower than in previous years. Average age of 14 inch fish was 1.5 years and mean Wr for most inch classes was ≥ 90 . Florida largemouth bass continue to dominate the genetics of this reservoir. Of the 30 age-0 fish collected for electrophoretic analysis, 86% contained Florida largemouth bass (FLMB) alleles and 59% were pure FLMB.
- **Crappie:** Crappie do not provide a substantial fishery at Lake Fairfield. Reproduction and recruitment of crappie is low: similar to other lignite-fired power-plant reservoirs in east Texas. Directed effort toward crappie during the December 1, 2002 to February 28, 2003 creel period was less than 0.05 hours/acre. However, anglers who targeted crappie had high catch and harvest rates (9.5 and 4.5 fish/hour) respectively. Trap net catch rate of black crappie at Lake Fairfield has historically been low (usually less than 1 fish per net night). However, in 2004 trap net catch rate increased to 3.6 fish/net night. Most of the fish were below the 10-inch minimum legal length but do show the potential for a fishery as these fish grow. Average age of 10-inch black crappie at Lake Fairfield in fall of 2004 was one year.
- **Red drum:** Red drum have been stocked in Lake Fairfield since 1984 but have proven difficult to sample by gill net. Fish were only collected in 1996 and 2005. However, anglers report success in catching red drum by rod and reel and the current state freshwater red drum record (36.83 lbs, 44 inches) was set on Lake Fairfield in 2001. Directed effort for red drum was 0.5 hours/acre during the winter quarter (December 1, 2002 – February 28, 2003) creel period. No angler catch or harvest was reported at that time. However, this is primarily a warm weather fishery and park staff report high directed-effort during summer and fall.
- **Management strategies:**
Based on current information, Lake Fairfield fishing regulations should be maintained at their current status. Annual stockings of red drum should be continued because past efforts have

established a popular fishery. Due to the importance of the red drum and catfish fisheries at Fairfield, additional optional-year gill netting should be conducted during spring 2007 to monitor these populations. Stocking of Florida largemouth bass has been unnecessary at Lake Fairfield due to the high percentage of pure Florida and Florida alleles in this population. Largemouth bass allele frequency should be re-evaluated in fall 2006 to assess genetic makeup and determine the possibility of collecting Florida brood stock from this location. With the decline in hydrilla coverage, the potential exists to introduce native submersed macrophyte species in several areas to mitigate the loss of hydrilla. Control of American lotus in the State Park swimming beach should continue.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Fairfield in 2004 and 2005. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other fishes was collected, this report deals primarily with major sport fishes and important prey species. Management strategies are included to address existing problems or opportunities.

Fish harvest regulations at Lake Fairfield in 2004-2005.

Species	Bag limit	Minimum length (inches)
Bass, largemouth	5	18
Bass, striped, its hybrids (palmetto bass) and subspecies	5	18
Bass, white	25	10
Catfish, blue and channel	25 (in combination)	12
Catfish, flathead	5	18
Crappie, black and white	25 (in combination)	10
Drum, red	3	20

METHODS

- Fishes were collected by electrofishing in fall (1 hours at 12, 5-minute stations), trap netting in fall (one net-night each at 5 stations), and gill netting in spring (one net-night each at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour of actual electrofishing, and for gill and trap nets, as the number of fish caught in one net set overnight. Largemouth bass electrophoresis samples were collected in accordance with Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).
- Sampling statistics (CPUE for various length categories) and structural indices (proportional stock density [PSD], relative stock density [RSD], and relative weight [Wr]) were calculated for target fishes, when appropriate, according to Anderson and Neumann (1996).

- Ages were determined for selected fishes using otoliths for largemouth bass and black crappie; sub sampling category 2. Analyses were conducted in accordance with the Texas Parks and Wildlife Department Inland Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).
- An access creel survey (9 days/winter quarter) was conducted to assess angler use, catch, and harvest. Interviews were conducted at the two boat ramps on the lake when anglers completed their fishing day. Analyses were conducted in accordance with the Texas Parks and Wildlife Department Inland Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).
- Littoral zone/physical habitat, aquatic vegetation, and angler access and facility surveys were conducted in accordance with the Texas Parks and Wildlife Department Inland Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2002).

LITERATURE CITED

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques 2nd edition. American Fisheries Society, Bethesda, Maryland.
- Ott, R. A., and T. J. Bister. 2001. Statewide freshwater fisheries monitoring and management program survey report for: Lake Fairfield, 2000. Texas Parks and Wildlife Department, Federal Aid in Sport Fish Restoration, Grant F-30-R, Performance Report. 26 pp.

Physical and historical data for Lake Fairfield, Texas, 2004.

Inland Fisheries water body code:	0073
IF District:	3-C, Tyler
Controlling authority:	TXU Electric Co.
Area:	2,034 acres
Counties:	Freestone
Latitude:	31° 49'
Longitude:	96° 02'
Nearest major metropolitan area and distance:	Dallas - 70 miles
Reservoir description:	Power-plant
River system:	Trinity
Shoreline length (mi.):	21.5
Mean depth (ft):	16.0
Maximum depth (ft):	50.0
Shoreline development ratio:	3.5
Watershed drainage area (mi ²)	30
Secchi disc range (ft):	4-6
Conductivity (µmhos/cm):	850
Constructed:	1969
Access:	
Boat public:	Adequate – 2 ramps
Boat private:	Adequate – 1 ramp
Bank:	Adequate-State park
Handicap:	Courtesy pier equipped with guard-rail

Survey History:

Method	Year
Gill net	1976, 1978, 1985, 1988, 1991, 1993, 1996, 1999, 2001, 2005
Electrofishing	1978, 1979, 1985–1997, 1988, 1991, 1993, 1996, 1999, 2000, 2002, 2004
Trap netting	1986, 1991, 1993, 1996, 1999, 2000, 2004
Cove Rotenone	1976, 1979, 1981, 1985
Creel survey	1978–1982, 2003
Vegetation survey	1983, 1993, 1996, 1999, 2000, 2004
Habitat survey	1991, 1993, 1996, 1999, 2000, 2004

Summary of aquatic vegetation survey, Lake Fairfield, Texas, 9/27/2004. Lake elevation was 1.1 feet below conservation pool elevation. Total surface area = 2,034 acres.

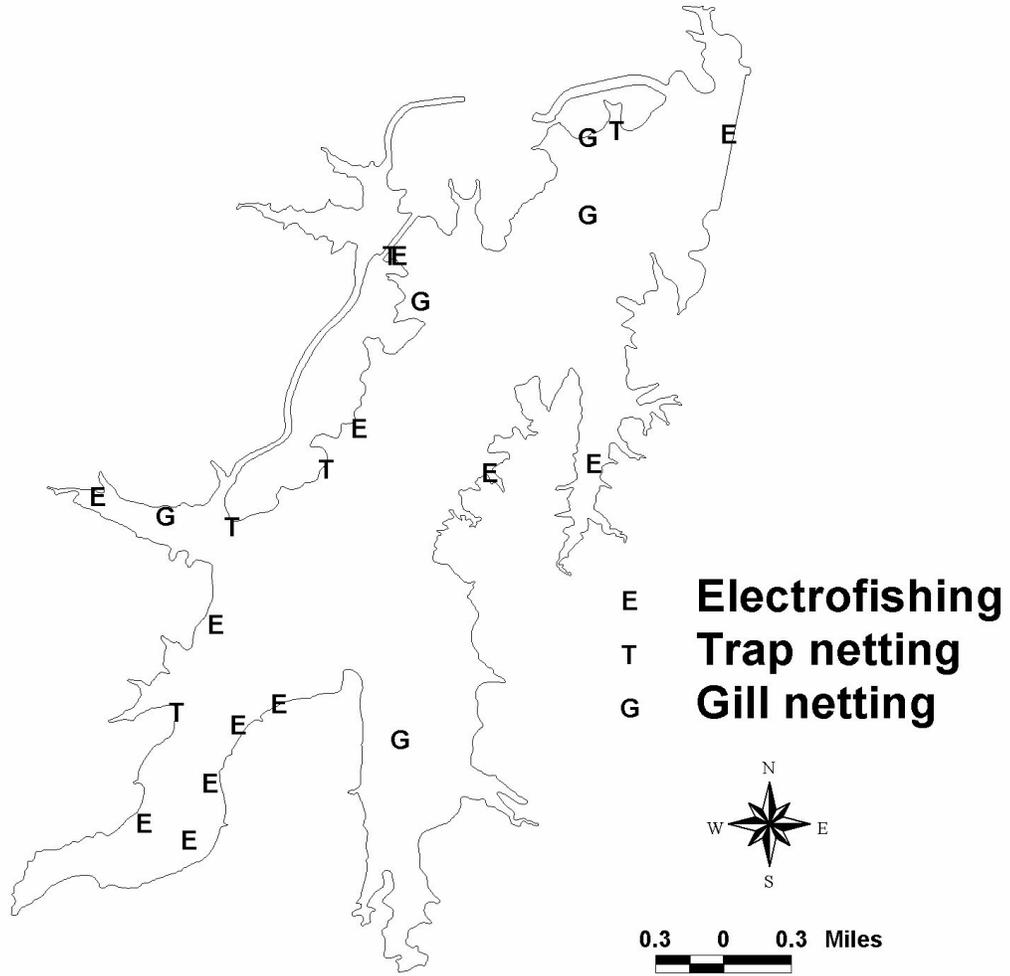
Vegetation type	Species	Acreage	Percent of total
Native (emergent)	Cattails	83	4
Native (submersed)	Pondweed	5	<1
Native (floating-leaved)	American lotus	370	18
Non-native/invasive (submersed)	Hydrilla	13	<1
Non-native/invasive (emergent)	Giant cane	42	2

Stocking history of Lake Fairfield, Texas.

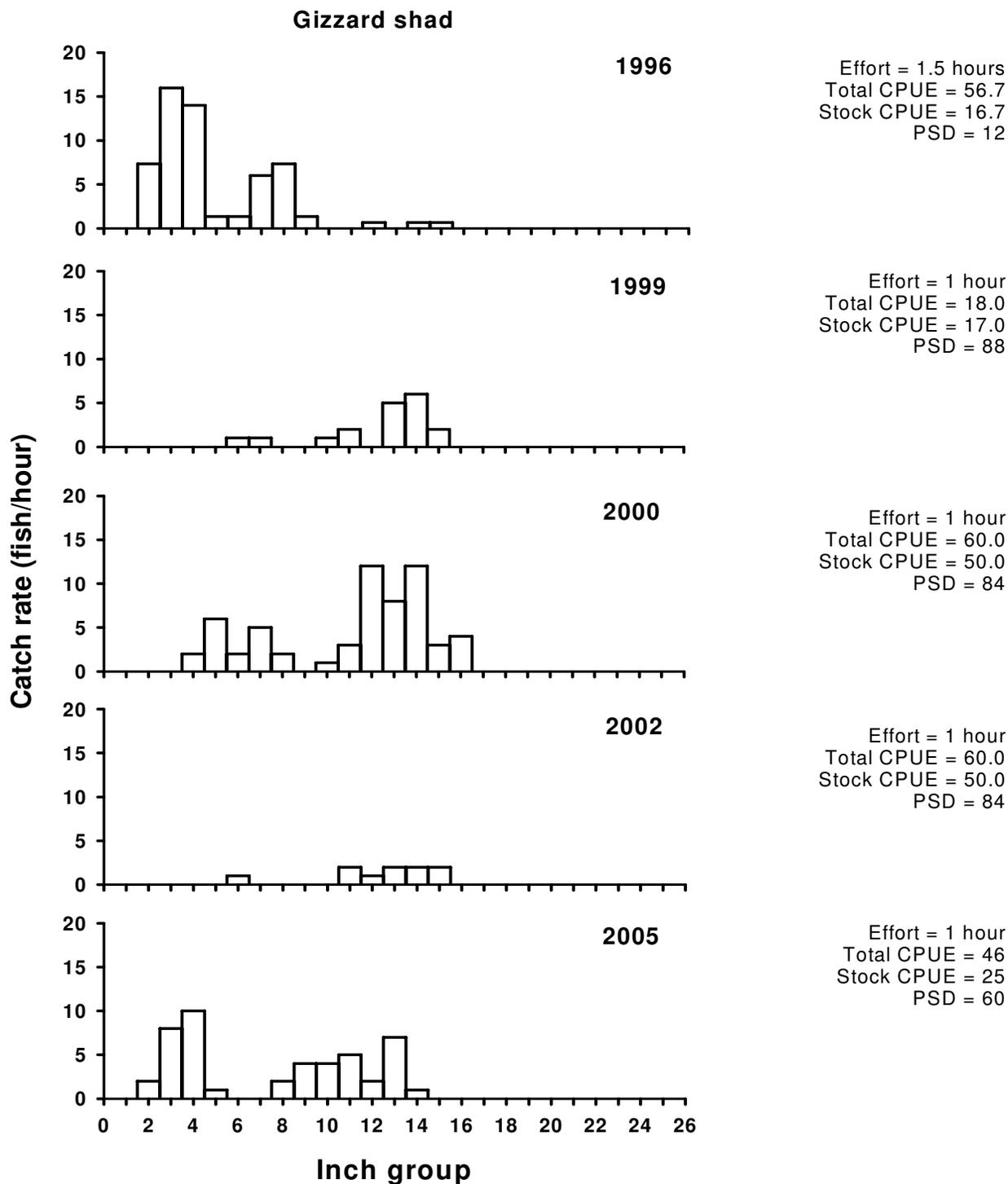
Species	Year	Number	Size
Channel catfish	1969	25,000	
		<u>25,000</u>	
Palmetto bass	1975	25,000	
	1977	23,985	
	1979	24,500	
	1982	25,422	Fingerling
	1986	35,650	Fry
	1987	49,025	Fingerling
	1988	49,226	Fingerling
	1991	36,700	Fry
	1992	36,265	Fingerling
	1993	21,200	Fingerling
	1994	37,100	Fingerling
	1995	43,100	Fingerling
	1996	35,285	Fingerling
	1997	35,441	Fingerling
	1998	22,647	Fingerling
1999	<u>35,625</u>	Fingerling	
	Total	536,171	
Largemouth bass	1970	250,000	Fingerling
		<u>250,000</u>	
	Total	250,000	
Florida largemouth bass	1975	123,100	Fingerling
	1976	122,500	Fingerling
	1977	130,000	Fingerling
	1979	<u>129,145</u>	Fingerling
	Total	504,745	
White crappie	1985	87,601	Fingerling
	1986	29,450	Fingerling
	1987	<u>353,439</u>	Fingerling
	Total	470,490	

Stocking history of Lake Fairfield, Texas, continued.

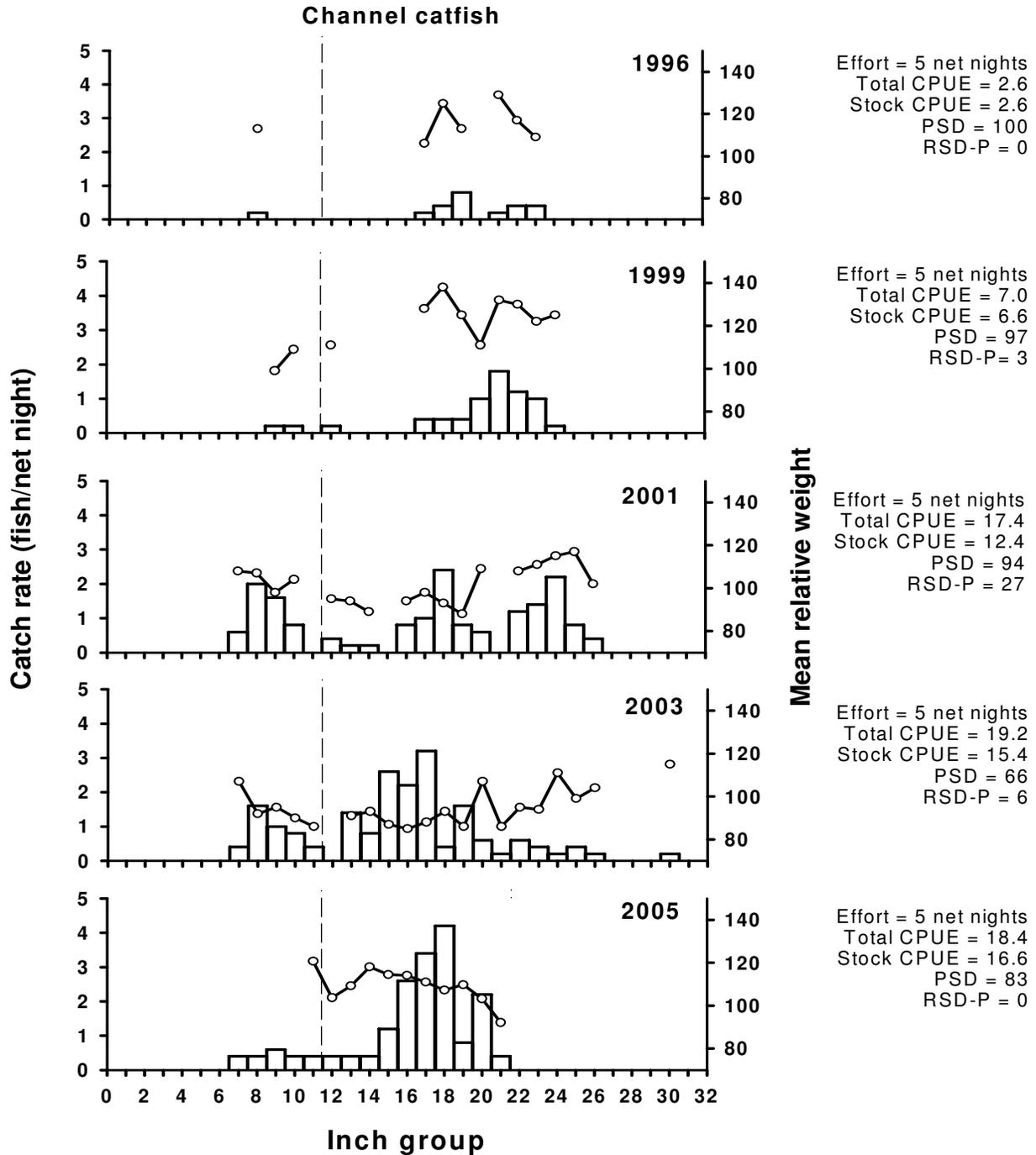
Species	Year	Number	Size
Black x white crappie	1993	117,650	Fingerling
	1994	118,177	Fingerling
	1995	249,208	Fingerling
		<u>485,035</u>	
Nile perch	1983	1,310	
	Total	<u>1,310</u>	
Red drum	1984	235,455	Fingerling
	1985	283,700	Fingerling
	1986	217,323	Fingerling
	1987	473,340	Fingerling
	1991	515,751	Fingerling
	1992	245,118	Fingerling
	1993	217,923	Fingerling
	1994	253,280	Fingerling
	1995	231,523	Fingerling
	1996	266,633	Fingerling
	1997	158,890	Fingerling
	1999	222,340	Fingerling
	2000	276,602	Fingerling
	2001	287,820	Fingerling
	2002	21,938	Fingerling
	2003	385,367	Fingerling
	2004	7,125	Fingerling
Total		<u>3,597,876</u>	



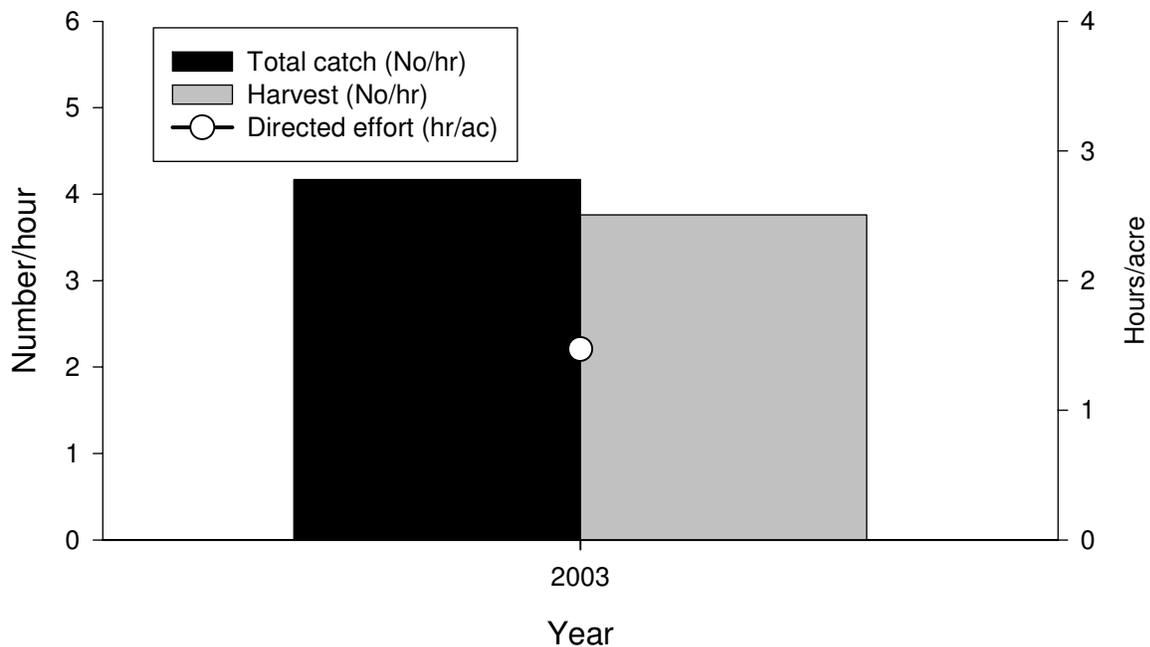
Locations of fish sampling stations, Lake Fairfield, Texas, 2004 - 2005.



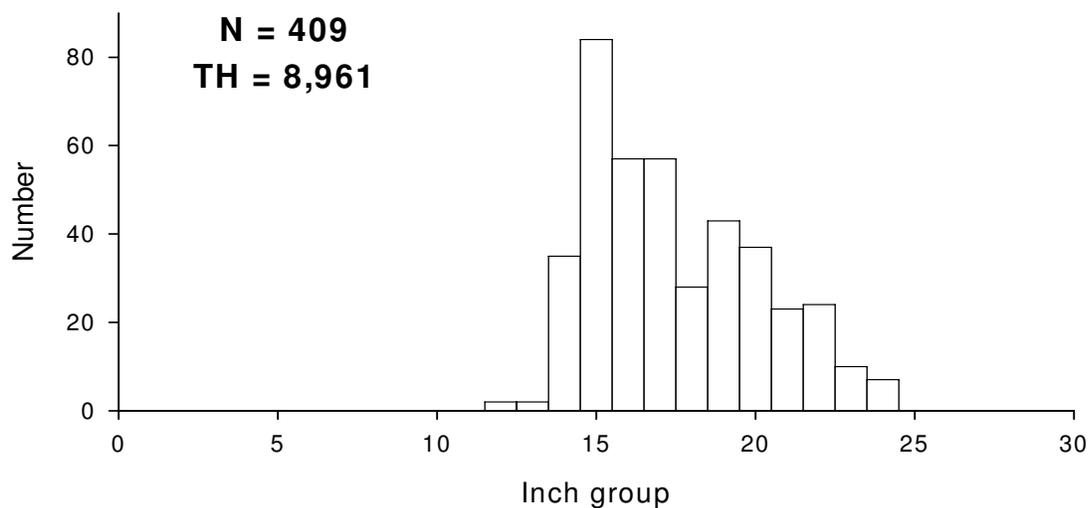
The number of gizzard shad caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Lake Fairfield, Texas.



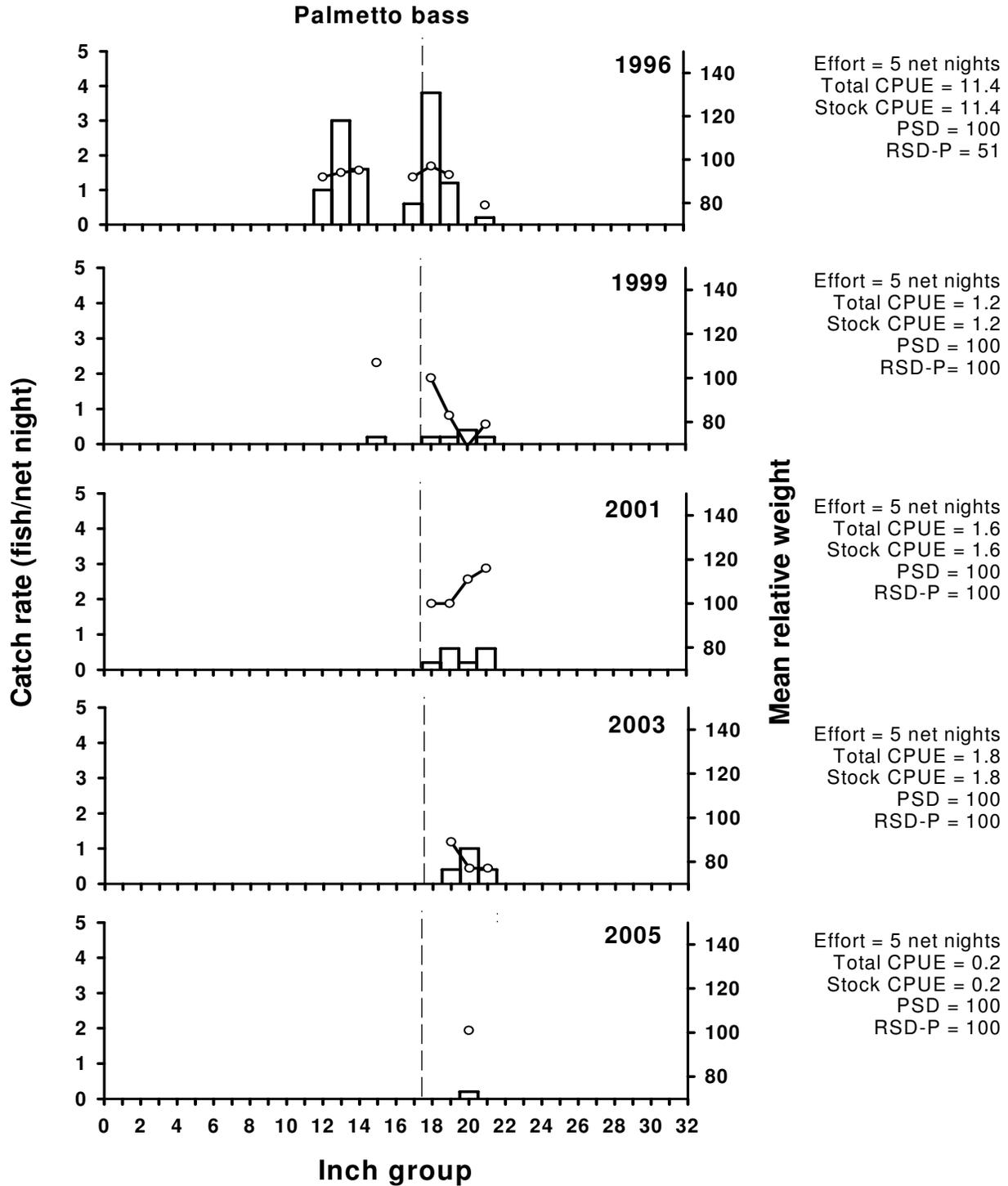
The number of channel catfish caught per net night (CPUE, bars), mean relative weight (lines), and population indices for spring gill net surveys, Lake Fairfield, Texas. Vertical dashed lines indicate minimum legal length.



Quarterly creel statistics for rod and reel anglers seeking any catfish species on Lake Fairfield, Texas, December 1, 2002 – February 28, 2003.

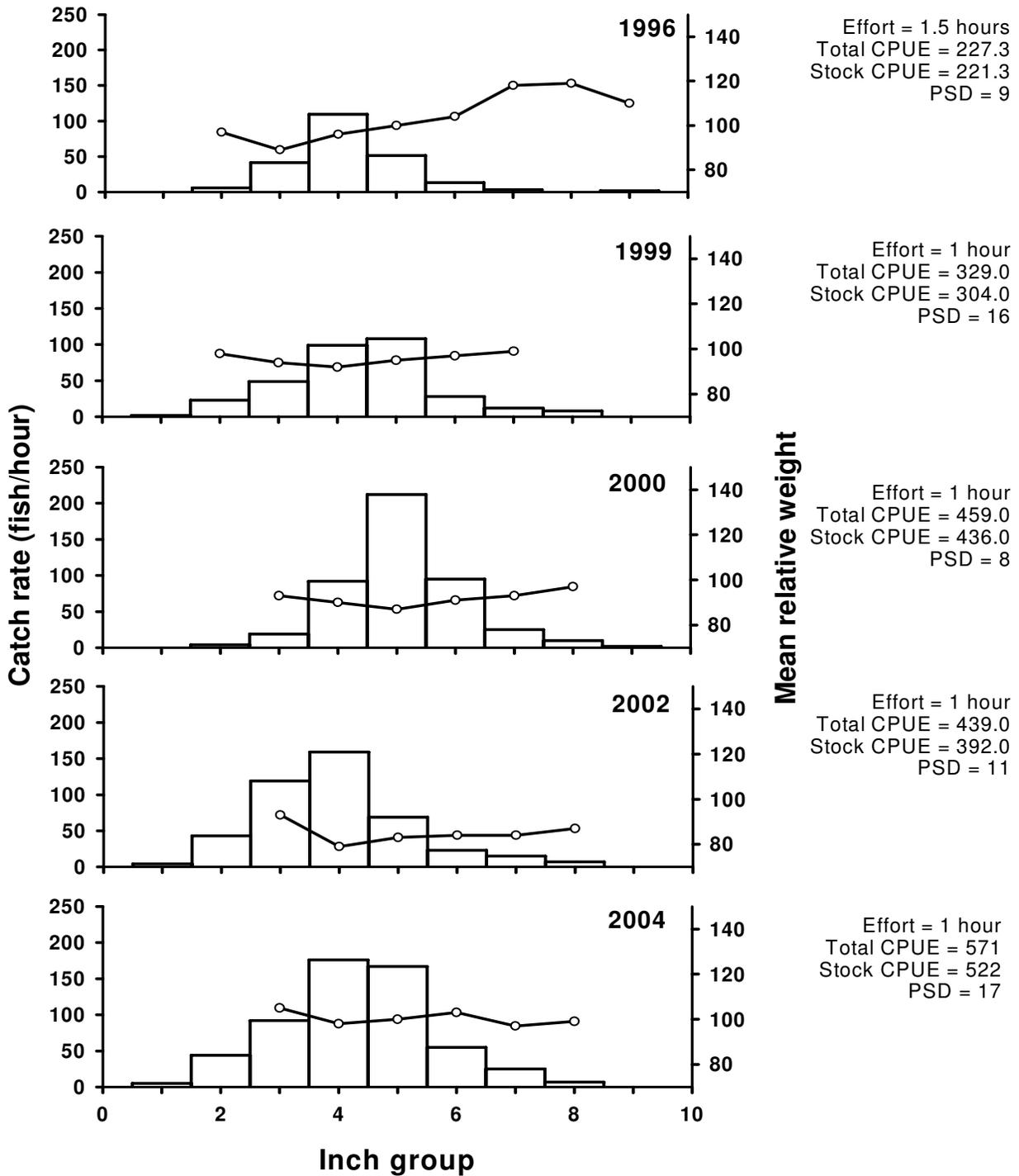


Length frequency distribution and number (N) of channel catfish measured in the creel and total estimated harvest (TH) for all anglers on Lake Fairfield, Texas, December 1, 2002 through February 28, 2003. Minimum legal length was 12 inches.

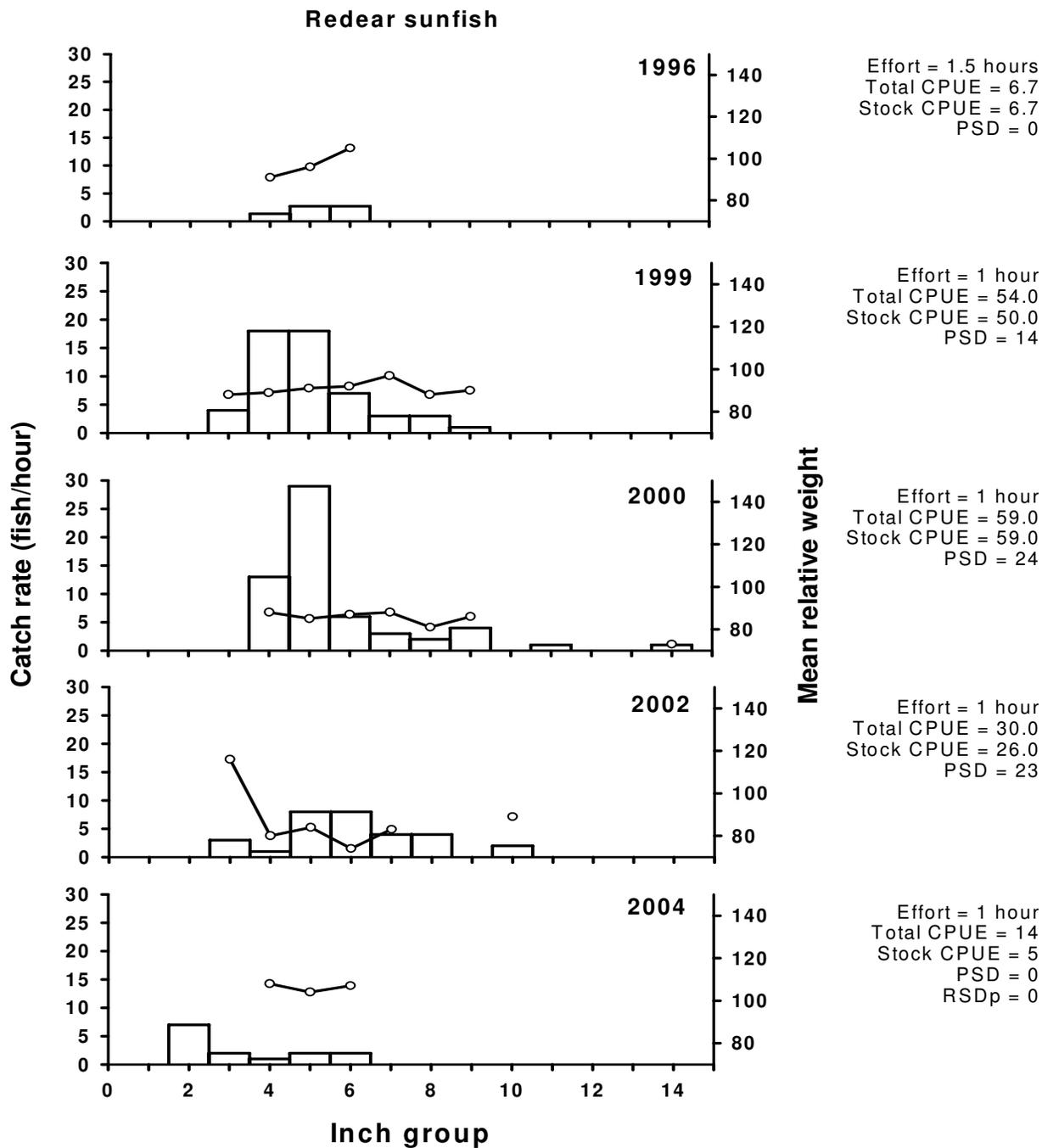


The number of palmetto bass caught per net night (CPUE, bars), mean relative weight (lines), and population indices for spring gill net surveys, Lake Fairfield, Texas. Vertical dashed lines indicate minimum legal length.

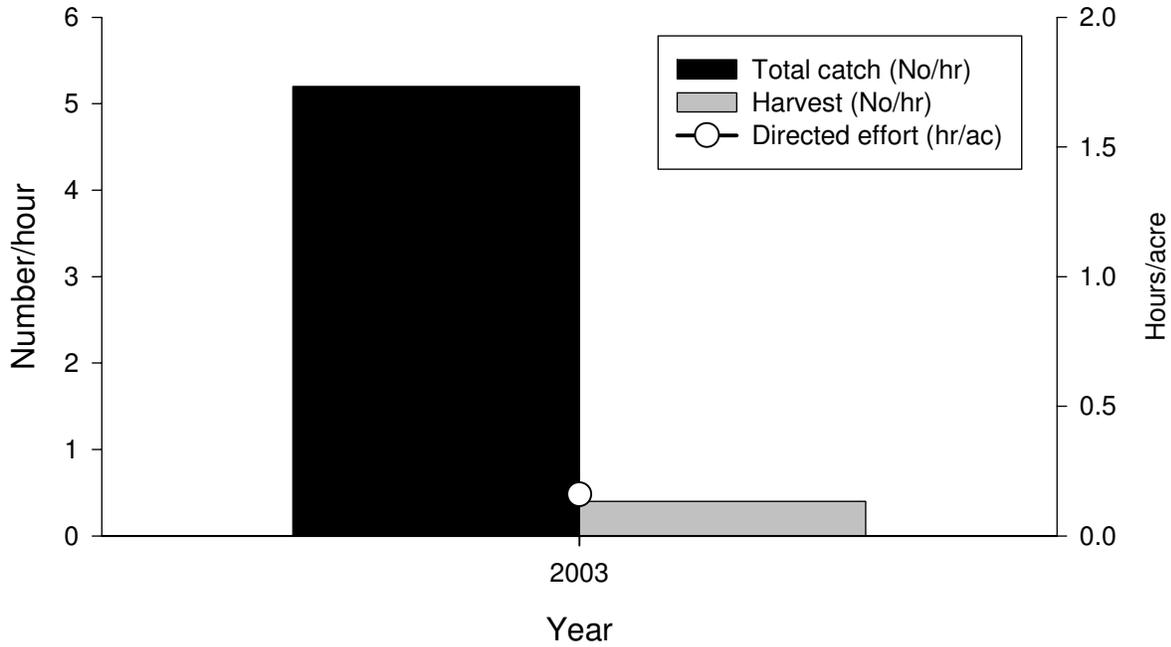
Bluegill



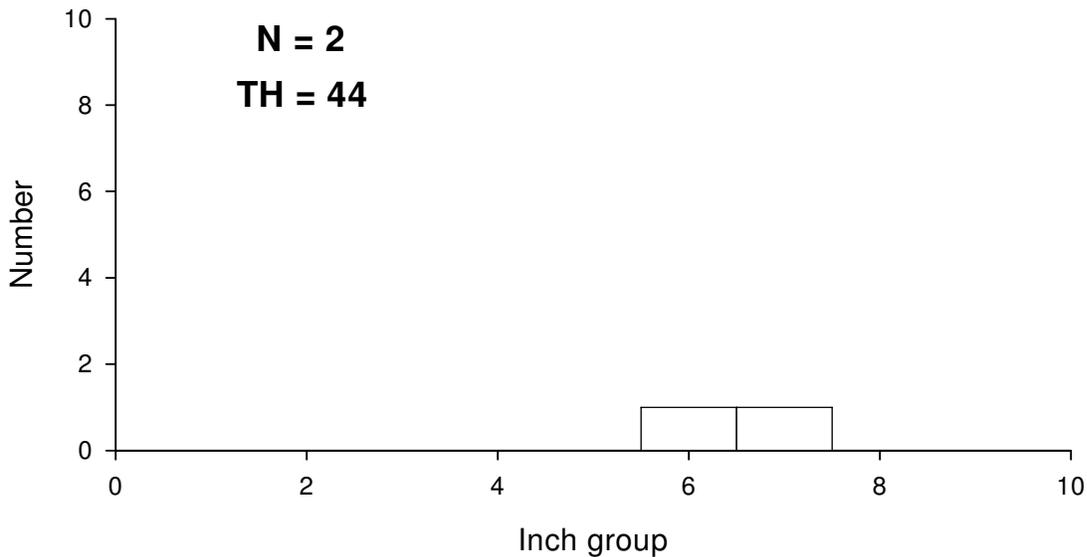
The number of bluegill caught per hour (CPUE, bars), mean relative weight (lines), and population indices for fall electrofishing surveys, Lake Fairfield, Texas.



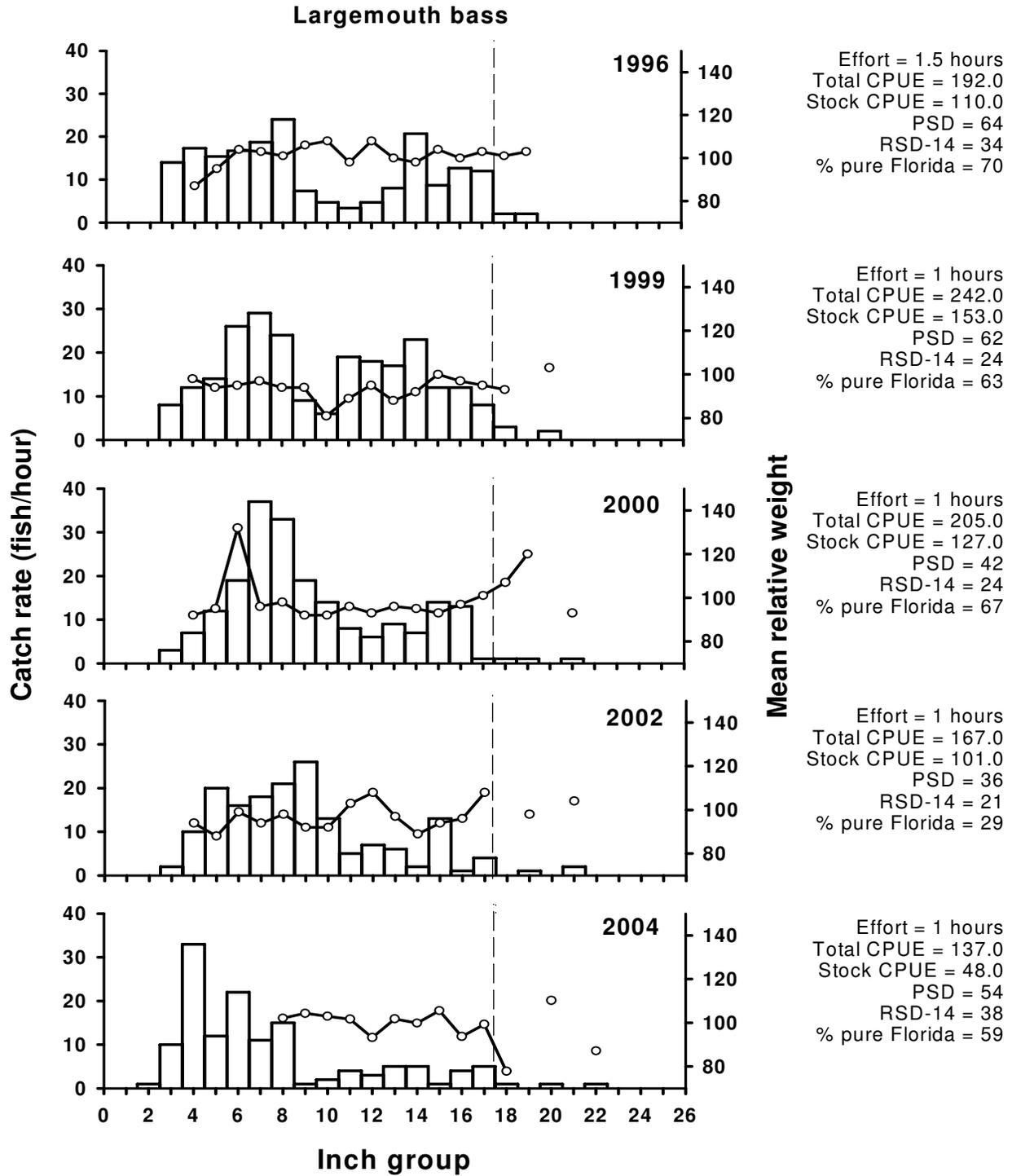
The number of reardear sunfish caught per hour (CPUE, bars), mean relative weight (lines), and population indices for fall electrofishing surveys, Lake Fairfield, Texas.



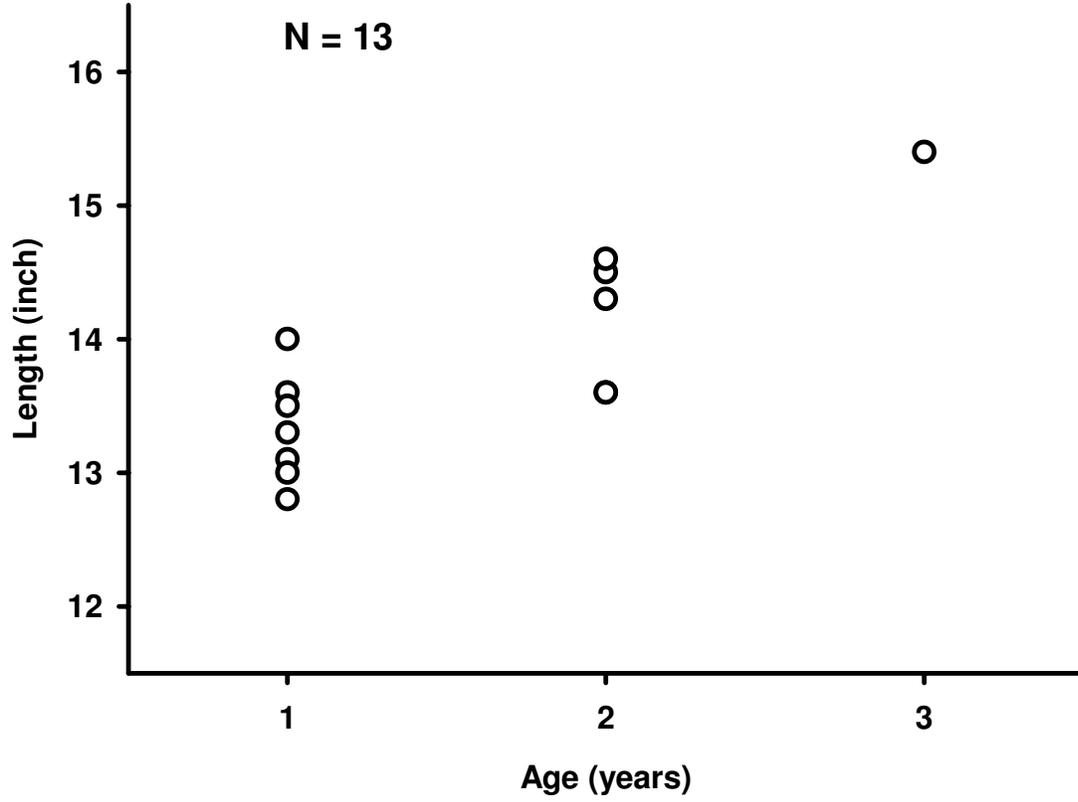
Annual creel statistics for rod and reel anglers seeking any sunfish species on Lake Fairfield, Texas, December 1, 2002 – February 28, 2003.



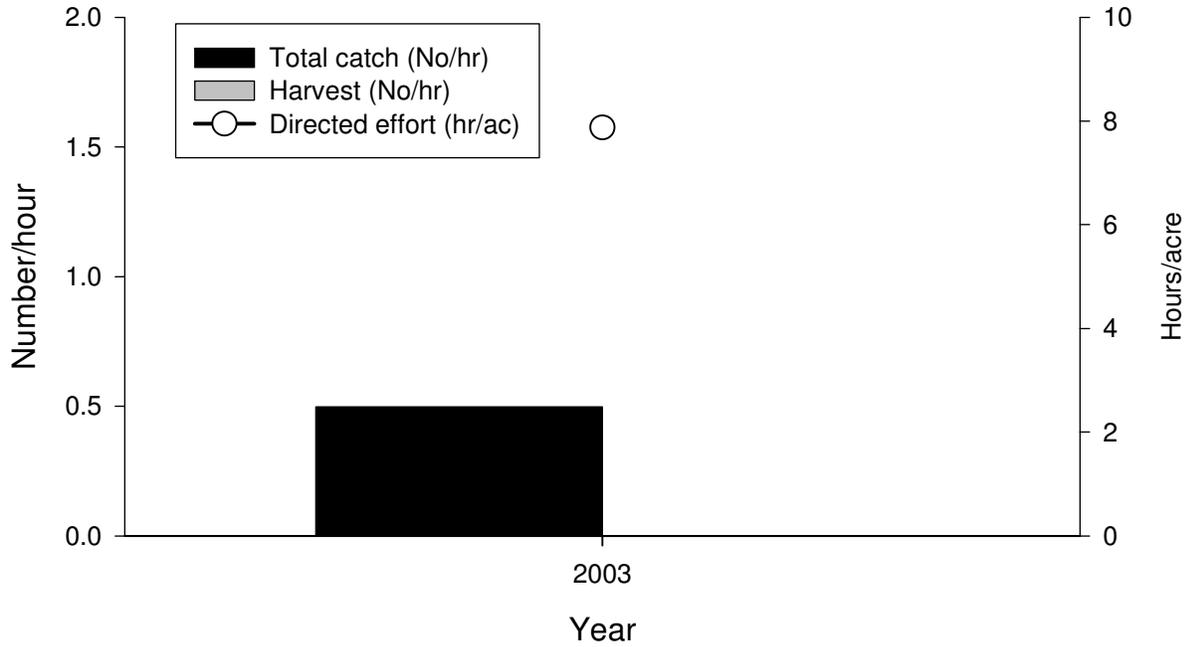
Length frequency distribution and number (N) of redear sunfish measured in the creel and total estimated harvest (TH) for all anglers on Lake Fairfield, Texas, December 1, 2002 through February 28, 2003.



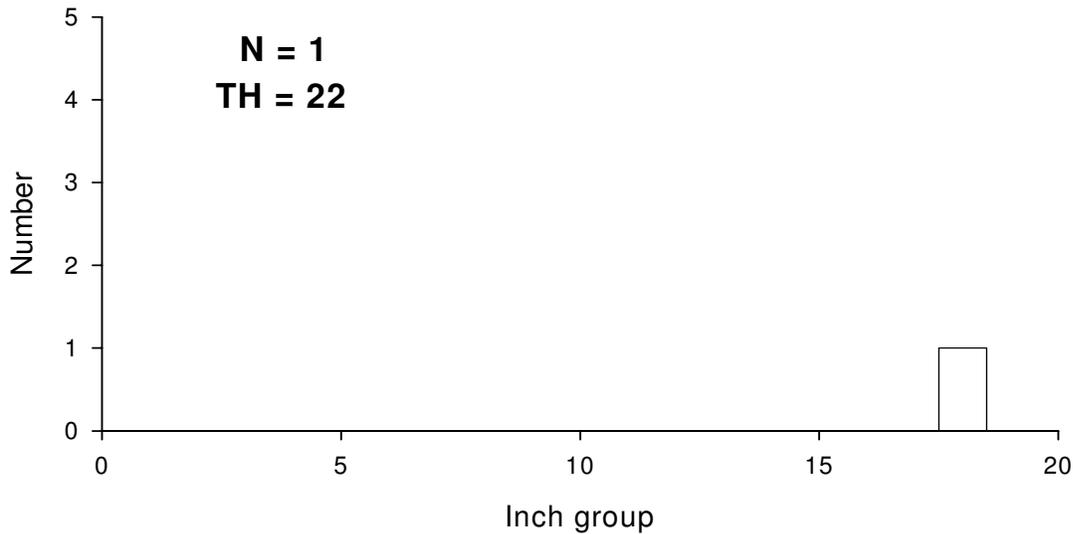
The number of largemouth bass caught per hour (CPUE, bars), mean relative weight (lines), and population indices for fall electrofishing surveys, Lake Fairfield, Texas. Vertical dashed line indicates minimum length limit.



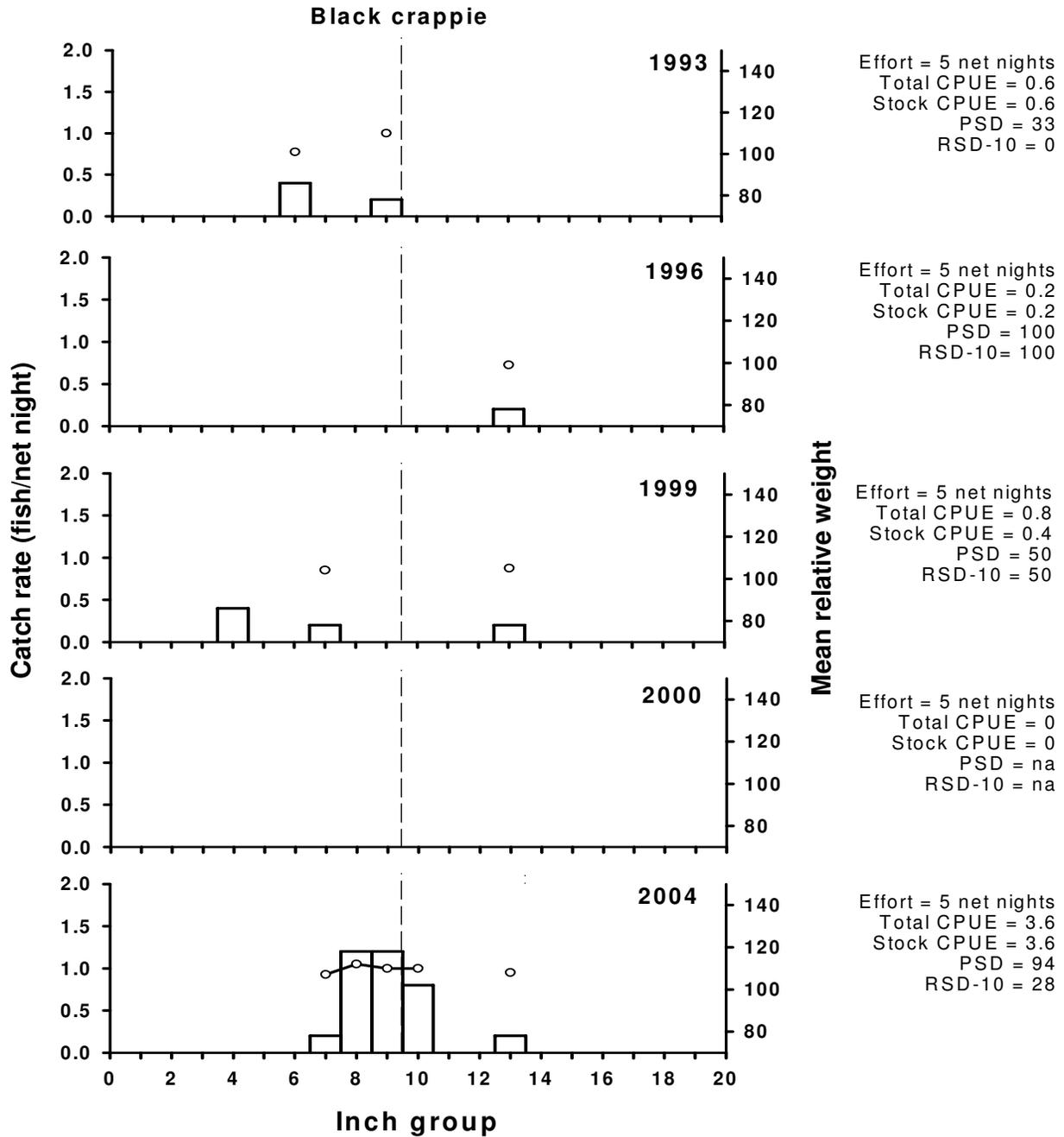
Length-at-age (inch) at time of capture for largemouth bass within one inch above and below 14 inches (sexes combined); sub sampling category 2, collected by fall electrofishing, Lake Fairfield, Texas, October 2004.



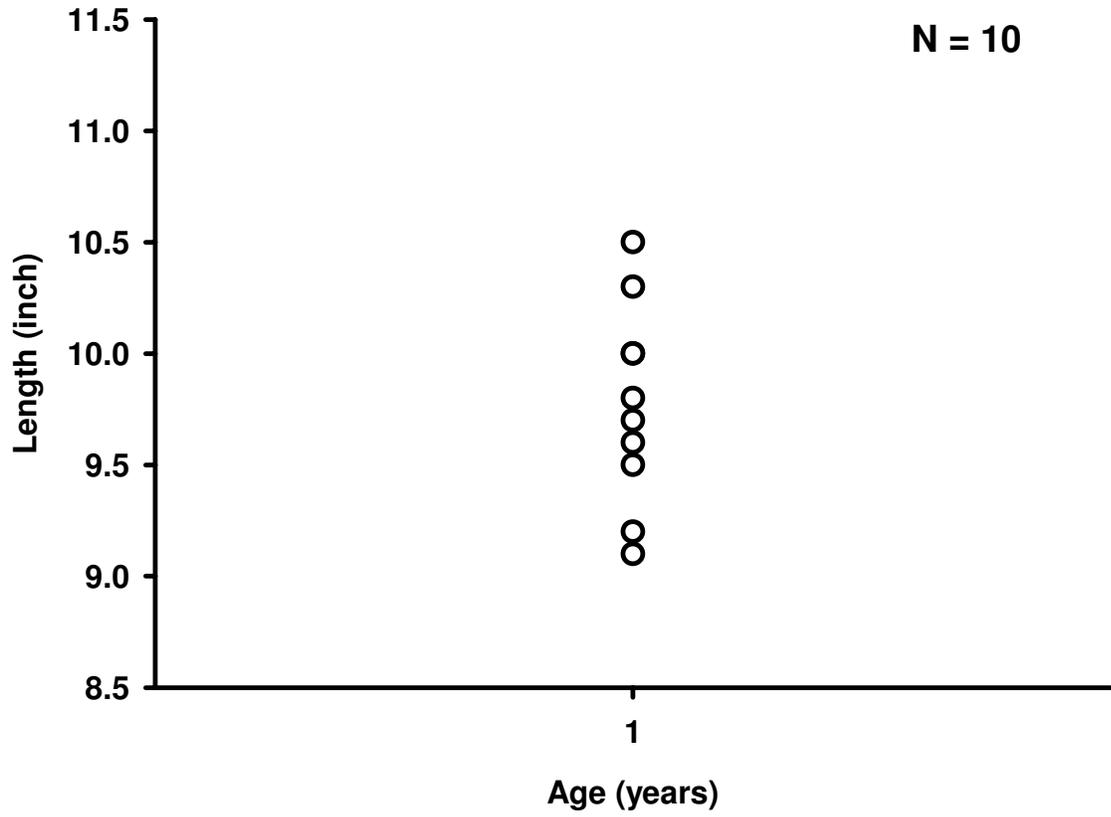
Quarterly creel statistics for rod and reel anglers seeking largemouth bass on Lake Fairfield, Texas, December 1, 2002 – February 28, 2003.



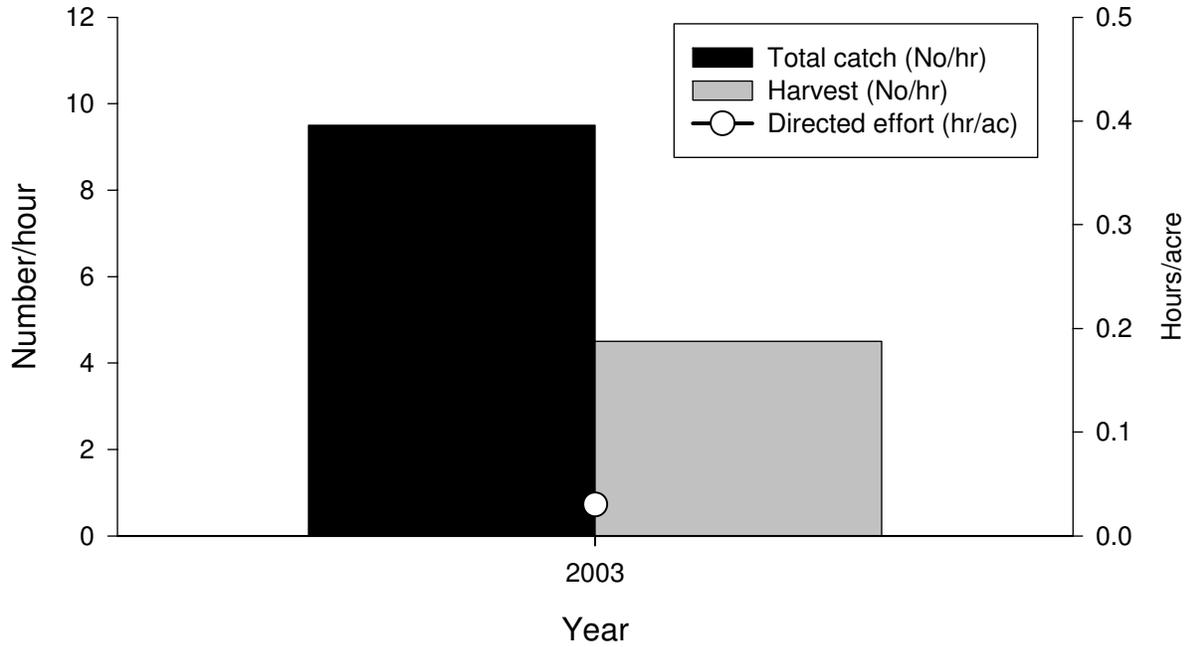
Length frequency distribution and number (N) of largemouth bass measured in the creel and total estimated harvest (TH) for all anglers on Lake Fairfield, Texas, December 1, 2002 through February 28, 2003. Minimum legal length was 18 inches.



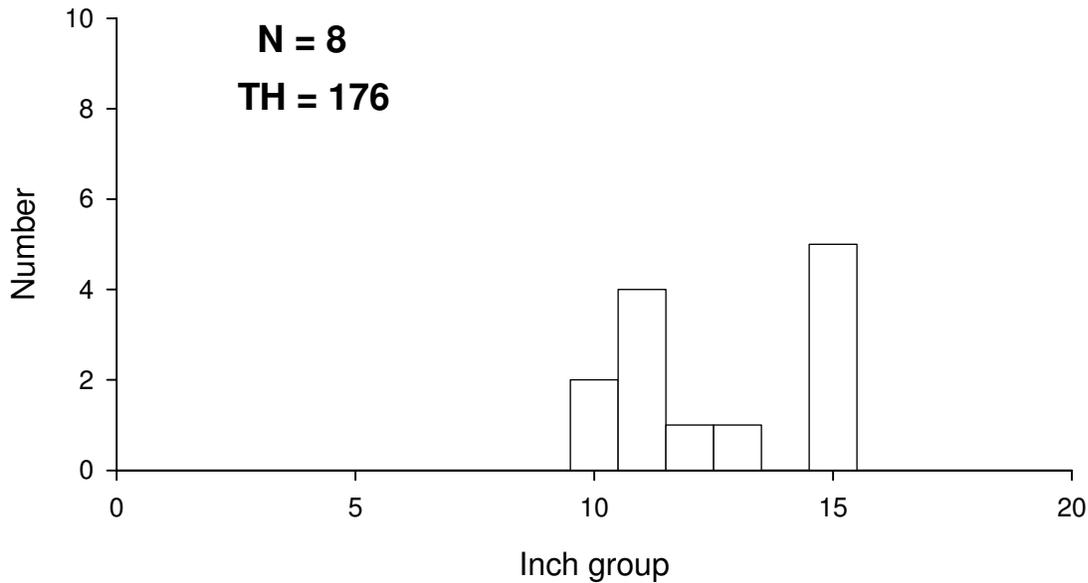
The number of black crappie caught per net night (CPUE, bars), mean relative weight (lines), and population indices for fall trap netting surveys, Lake Fairfield, Texas. Vertical dashed line indicates minimum length limit.



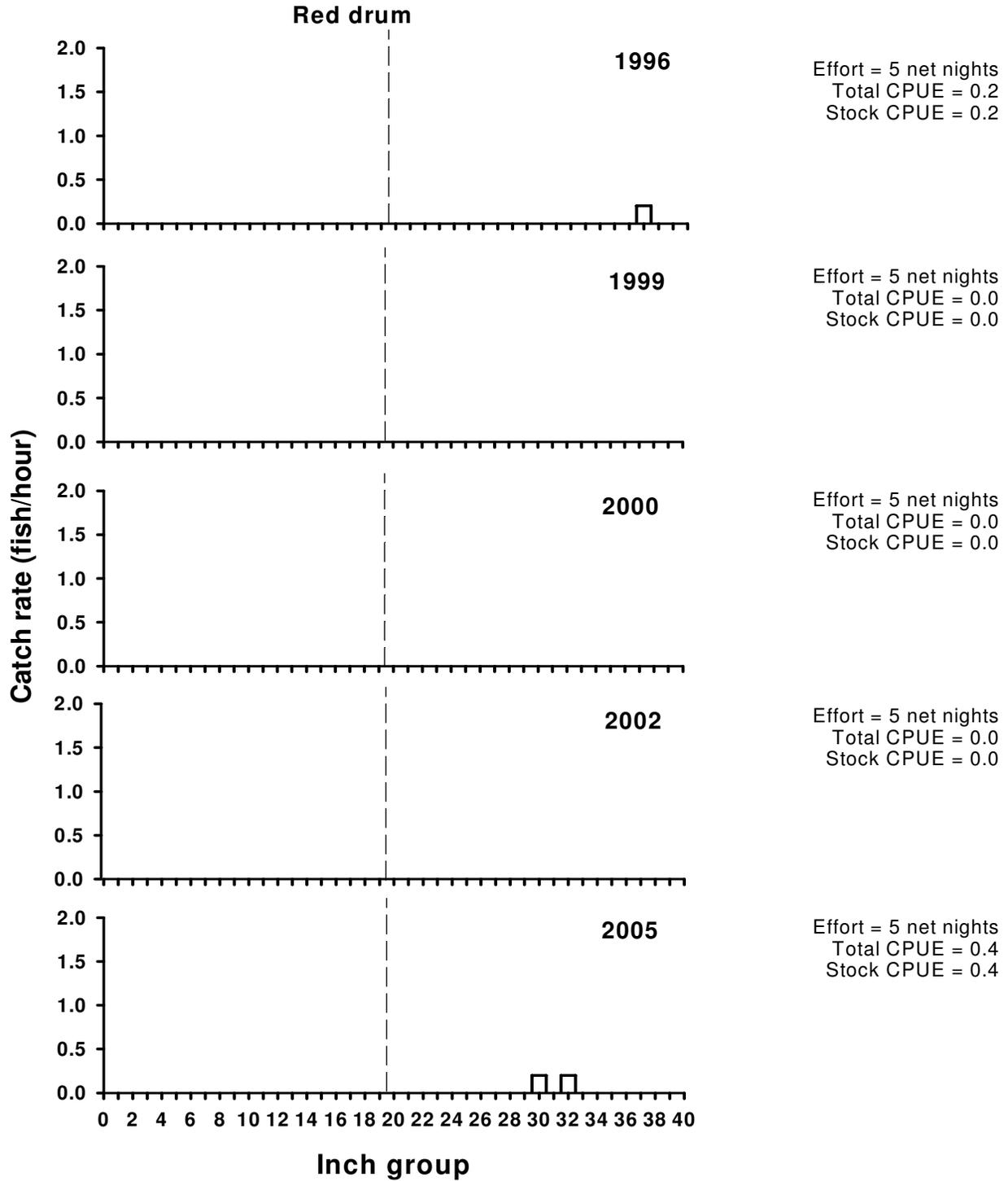
Length-at-age (inch) at time of capture for black crappie within one inch above and below 10 inches mm (sexes combined); sub sampling category 2 collected by fall electrofishing, Lake Fairfield, Texas, November 2004.



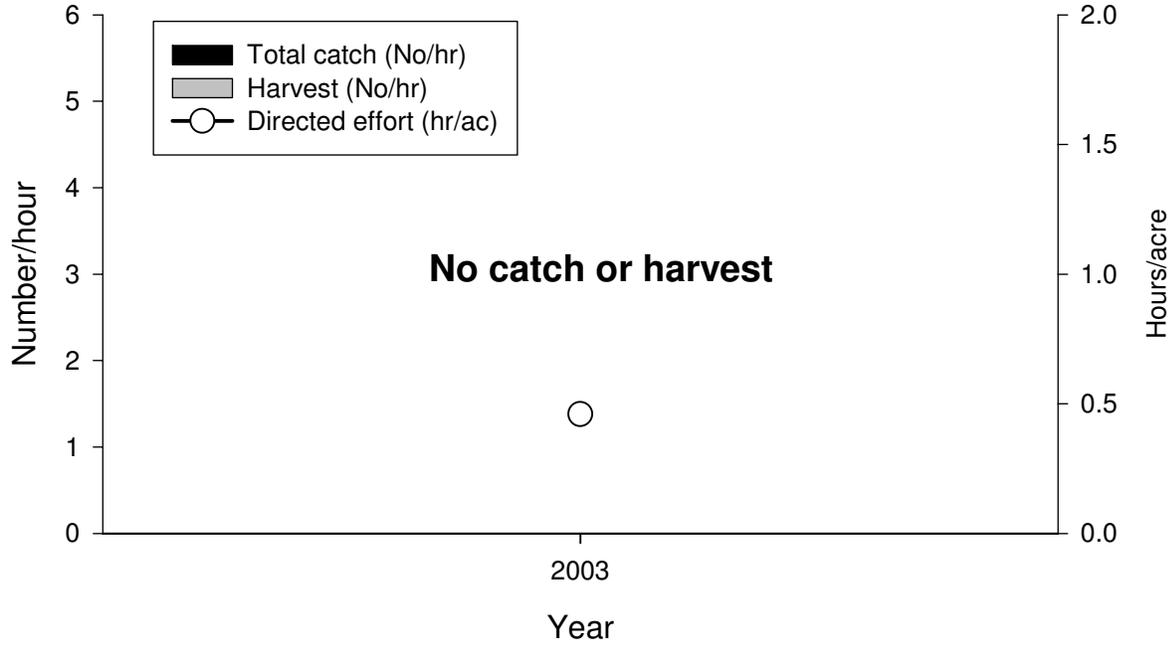
Quarterly creel statistics for rod and reel anglers seeking any crappie species on Lake Fairfield, Texas, December 1, 2002 – February 28, 2003.



Length frequency distribution and number (N) of black crappie measured in the creel and total estimated harvest (TH) for all anglers on Lake Fairfield, Texas, December 1, 2002 through February 28, 2003. Minimum legal length was 10 inches.



The number of red drum caught per net night (CPUE, bars), mean relative weight (lines), and population indices for spring gill netting surveys, Lake Fairfield, Texas. Vertical dashed line indicates minimum length limit.



Quarterly creel statistics for rod and reel anglers seeking red drum on Lake Fairfield, Texas, December 1, 2002 – February 28, 2003.

Fisheries Management Plan Lake Fairfield

Prepared July 2005

ISSUE 1 Annual stockings of red drum since 1991 have established a popular fishery and a new freshwater state record of 37 lbs was caught in May 2001. Despite the quality of the fishery, sampling of this species has proved difficult and anecdotal information from anglers comprises most of the information available. Since this species does not reproduce in fresh water, annual stockings are required to maintain the fishery.

MANAGEMENT STRATEGIES

1. Continue annual stockings of red drum fingerlings at 100/acre.
2. Continue attempts to assess the fishery through gill net surveys in 2007.

ISSUE 2 The channel catfish population continues to expand and fish > 16 inches are abundant.

MANAGEMENT STRATEGIES

1. Promote the quality of the channel catfish population through news releases.
2. Provide lake-specific regulation posters to vendors of angling-oriented businesses serving the Lake Fairfield vicinity.

ISSUE 3 Largemouth bass continue to provide a quality fishery under the special 18-inch minimum length limit. Total catch rate and catch rate of stock size fish showed a slight decline compared to previous years. However, PSD and RSD -14 continue to be in the target range. Allele frequency of Florida strain largemouth bass continues to be high (> 60%).

MANAGEMENT STRATEGIES

1. Continue monitoring of largemouth bass population distribution, growth, and allele frequency by electrofishing in fall 2006 and 2008.

ISSUE 4 Angler access is maintained by Fairfield Lake State Park and is excellent. Boat and bank access is adequate with two boat ramps and one fishing pier. The fishing pier meets ADA specifications. In addition to the fishing pier, several bank access areas are present and provide additional opportunity.

MANAGEMENT STRATEGIES

1. Continue monitoring of access and facilities during the next habitat survey in 2008. If recommendations are warranted provide them to the park staff.
2. Provide regulation signs to park staff to update those previously posted at boat ramps and fishing pier.

ISSUE 5 Overall coverage of hydrilla has declined compared to previous surveys. Native emergent vegetation (giant cane and cattails) provide excellent shallow water habitat in many areas. American lotus continues to be problematic in the park swimming area and will likely need continued treatment.

MANAGEMENT STRATEGIES

1. Continue monitoring aquatic vegetation during routine habitat survey in 2008. As techniques for establishment of diverse native plant community establishment are developed, discuss the possibility of species introduction with the controlling authority.
2. Continue coordinating treatment of American lotus in the swimming area with TPWD Aquatic Habitat Enhancement staff and park personnel.

Appendix 1

Number (N) and catch rate (CPUE) of target species collected by all gear types from Lake Fairfield, Texas, 2004 - 2005.

Species	Gill netting (15 net nights)		Trap netting (15 net nights)		Electrofishing (1 hour)	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					46	46.0
Threadfin shad					112	112.0
Channel catfish	92	18.4				
Palmetto bass	1	0.2				
Green sunfish					2	2.0
Bluegill					571	571.0
Longear sunfish					57	57.0
Redear sunfish					14	14.0
Spotted sunfish					5	5.0
Largemouth bass					137	137.0
Black crappie			18	3.6		
Red drum	2	0.4				

Appendix 2

Results of electrophoretic analysis of largemouth bass collected by electrofishing from Lake Fairfield, Texas, 1996, 1999, 2000, and 2004.

Year	Sample size	Genotype				% FLMB alleles	% pure FLMB
		Florida	F1	Fx	Northern		
1996	30	21	4	5	0	88.3	70.0
1999	30	19	1	10	0	88.3	63.3
2000	30	20	1	9	0	90.8	66.7
2002	30	9	3	16	0	77.6	28.8
2004	30	16	2	9	0	86.0	59.3

Appendix 3

Angler access facilities, Lake Fairfield, Texas, August 2004. Locations include two boat ramps and one fishing pier.

Name	GPS coordinates	Fee charged	# of lanes	Accommodations for challenged	Bank fishing	Comments
Marina Ramp	N 31'46.835 W 96'04.236	N*	2	N	N	
Camping Area Ramp	N 31'47.678 W 96'03.504	N*	2	N	Y	
Fishing Pier	N 31' 46.798 W 96'04.277	N*	na	Y	Y	

* No fee is charged for ramp use but a park entrance fee is charged.